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What is claimed is:

1. An optical system which transmits light and has first and second settings, the first setting providing a magnification M_1 and the second setting providing a magnification M_2 , wherein:

- (i) $M_2/M_1 > 1.0$;
- (ii) said system has an exit pupil which has a diameter D_1 for the first setting and a diameter D_2 for the second setting;
- (iii) D_1 and D_2 are substantially the same; and
- (iv) the first and second settings are the only rest positions of the optical system.

2. The optical system of Claim 1 wherein:

$$1.0 < D_1/D_2 < 1.5.$$

3. An optical system which transmits light and has first and second settings, the first setting providing a magnification M_1 and the second setting providing a magnification M_2 , wherein:

- (i) $M_2/M_1 > 1.0$;
- (ii) the first and second settings are the only rest positions of the optical system; and
- (iii) the system comprises a two position aperture stop which restricts more light when the system is in the first setting than when the system is in the second setting.

4. The optical system of Claim 3 wherein the two position aperture stop does not restrict light when the optical system is in the second setting.

5. The optical system of Claim 3 wherein:

- (i) the optical system has an exit pupil which has a diameter D_1 for the first setting and a diameter D_2 for the second setting; and
- (ii) D_1 and D_2 are substantially the same.

6. The optical system of Claim 5 wherein:

$$1.0 < D_1/D_2 < 1.5.$$

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7. The optical system of Claim 3 wherein the optical system comprises an objective and an eyepiece and the two position aperture stop is located between the objective and the eyepiece and is closer to the objective than to the eyepiece.

8. A dual power binocular having an objective end and an eyepiece end, said binocular comprising two optical systems according to Claim 1 or Claim 3 and a switching mechanism which simultaneously switches the two systems between their two settings.

9. The dual power binocular of Claim 8 wherein:

(i) the binocular further comprises a focusing system with a manual input;

(ii) the switching mechanism has a manual input; and

(iii) the manual input for the focusing system is closer to the objective end than the manual input for the switching mechanism.

10. The dual power binocular of Claim 9 wherein the binocular comprises a bridge and both the manual input for the focusing system and the manual input for the switching mechanism are located on the bridge.

11. An optical system which transmits light, said system comprising:

(a) an aperture assembly comprising an aperture, said assembly having two orientations in one of which the aperture restricts the amount of light transmitted through the optical system (the light-restricting orientation) and in the other of which it does not restrict the amount of light transmitted through the optical system (the non-light restricting orientation);

(b) a first mechanism which moves the aperture assembly between the light-restricting and the non-light restricting orientations, said first mechanism having a path of motion which includes a first rest position corresponding to the light-restricting orientation and a second rest position corresponding to the non-light restricting orientation;

(c) a second mechanism comprising a spring which (1) is adapted to bias the first mechanism into either the first rest position or the second rest

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position, (2) causes the first mechanism to automatically switch to the first rest position once the first mechanism has moved past a first position along its path of motion, and (3) causes the first mechanism to automatically switch to the second rest position once the first mechanism has moved past a second position along its path of motion; and

(d) a third mechanism which:

(i) when the first mechanism is in its first rest position, is adapted to move the first mechanism between the first rest position and the second position; and

(ii) when the first mechanism is in its second rest position, is adapted to move the first mechanism between the second rest position and the first position.

12. The optical system of Claim 11 wherein the first mechanism comprises a first pin, the system comprises a housing, the housing comprises a second pin, and the spring of the second mechanism is a torsion spring having first and second ends each of which comprises a loop, one loop being rotatably mounted on the first pin and the other loop being rotatably mounted on the second pin.

13. The optical system of Claim 12 wherein the torsion spring comprises a main coil and the first mechanism comprises a recess through which the main coil passes as the first mechanism moves between its first and second rest positions.

14. The optical system of Claim 11 wherein the first mechanism comprises a shaft and a bushing adapted to translate along the shaft and the second and third mechanisms apply forces to the bushing within the same quadrant of the shaft.

15. The optical system of Claim 11 wherein in addition to the aperture assembly, the first mechanism moves a lens assembly.

16. The optical system of Claim 15 wherein the movement of the lens assembly changes the magnification of the optical system.

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17. The optical system of Claim 11 wherein there is a range of free movement between the third mechanism and the first mechanism.

18. The optical system of Claim 11 wherein the third mechanism is manually operated.

19. A binocular comprising two optical systems according to Claim 11 wherein the third mechanisms of the two systems share at least one common element so as to ensure simultaneous movement of the first mechanisms of the systems along their paths of motion.

20. An optical system which transmits light comprising:

- (a) a lens assembly which transmits light;
- (b) a focusing system for moving the lens assembly to focus the optical system;
- (c) an aperture assembly which receives light from the lens assembly, said aperture assembly comprising an aperture having two orientations in one of which the aperture restricts light transmission (the light-restricting orientation) and in the other of which it does not restrict light transmission (the non-light restricting orientation); and
- (d) an aperture drive mechanism for transferring the aperture assembly between the two orientations;

wherein when the focusing system moves the lens assembly, it also moves the aperture assembly but does not change the aperture assembly's orientation.

21. The optical system of Claim 20 wherein the system comprises a diaphragm associated with the lens assembly and when the aperture assembly is in its light-restricting orientation, it contacts the diaphragm and remains in contact with the diaphragm as the focusing system moves the lens and aperture assemblies.

22. The optical system of Claim 20 wherein the aperture drive mechanism comprises a moveable member which allows the aperture assembly

to maintain its orientation as the focusing system moves the lens and aperture assemblies.

23. The optical system of Claim 22 wherein the moveable member has a forked configuration which spans the aperture.

24. The optical system of Claim 22 wherein as the focusing system moves the lens and aperture assemblies, the moveable member translates relative to the aperture assembly if the aperture assembly is in the non-light restricting orientation and the moveable member translates and rotates if the aperture assembly is in the light-restricting orientation.

25. The optical system of Claim 22 wherein the aperture assembly comprises at least one groove and the moveable member comprises at least one pin which moves in the at least one groove.

26. The optical system of Claim 22 wherein the aperture drive mechanism has a first rest position corresponding to the light-restricting orientation and a second rest position corresponding to the non-light restricting orientation, and the optical system further comprises a housing which comprises at least one ramp which engages the moveable member and guides that member so as to move the aperture assembly from the non-light restricting orientation to the light-restricting orientation as the aperture drive mechanism moves from its second rest position to its first rest position.

27. The optical system of Claim 26 wherein the moveable member comprises at least one pin which engages the at least one ramp.

28. The optical system of Claim 27 wherein the aperture assembly comprises at least one groove and the at least one pin of the moveable member rides in the at least one groove.

29. The optical system of Claim 26 wherein the focusing system moves the housing and the housing carries the lens assembly.

30. The optical system of Claim 29 wherein the aperture assembly is pivotally mounted to the housing.

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31. The optical system of Claim 20 wherein the aperture drive mechanism comprises a spring which, when the aperture assembly is in the light-restricting orientation, biases the aperture assembly towards said light-restricting orientation, and when the aperture assembly is in the non-light restricting orientation, biases the aperture assembly towards said non-light restricting orientation.

32. The optical system of Claim 20 wherein the lens assembly comprises at least one objective lens element.

33. The optical system of Claim 20 wherein the light-restricting orientation and the non-light restricting orientation are substantially perpendicular to one another.

34. A binocular comprising two optical systems according to Claim 20, wherein the focusing systems of the two optical systems share at least one common element so as to ensure simultaneous focusing of the two optical systems and the aperture drive mechanisms of the two optical systems share at least one common element so as to ensure simultaneous transferring of the aperture assemblies of the two optical systems between their two orientations.

35. An optical system which transmits light comprising:

(a) an aperture assembly comprising an aperture, said assembly having two orientations in one of which the aperture restricts the amount of light transmitted through the optical system (the light-restricting orientation) and in the other of which it does not restrict the amount of light transmitted through the optical system (the non-light restricting orientation); and

(b) an aperture drive mechanism for transferring the aperture assembly between the two orientations, said mechanism comprising a spring which, when the aperture assembly is in the light-restricting orientation, biases the aperture assembly towards said light-restricting orientation, and when the aperture assembly is in the non-light restricting orientation, biases the aperture assembly towards said non-light restricting orientation.

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36. A binocular comprising two optical systems according to Claim 35, wherein the aperture drive mechanisms of the two optical systems share at least one common element so as to ensure simultaneous transferring of the aperture assemblies of the two optical systems between their two orientations.

37. An optical system which transmits light comprising:

(a) an aperture assembly comprising an aperture, said assembly having two orientations in one of which the aperture restricts the amount of light transmitted through the optical system (the light-restricting orientation) and in the other of which it does not restrict the amount of light transmitted through the optical system (the non-light restricting orientation);

(b) an aperture drive mechanism for transferring the aperture assembly between the two orientations, said aperture drive mechanism having a first rest position corresponding to the light restricting orientation and a second rest position corresponding to the non-light restricting orientation; and

(c) a housing which comprises at least one ramp which engages the aperture drive mechanism so as to guide the aperture assembly from the non-light restricting orientation to the light-restricting orientation as the aperture drive mechanism moves from its second rest position to its first rest position.

38. The optical system of Claim 37 wherein the aperture drive mechanism comprises at least one pin which engages the ramp.

39. The optical system of Claim 37 wherein the ramp is stepped.

40. A binocular comprising two optical systems according to Claim 37, wherein the aperture drive mechanisms of the two optical systems share at least one common element so as to ensure simultaneous transferring of the aperture assemblies of the two optical systems between their two orientations.

41. An optical system which transmits light, said system having an exit pupil and comprising:

(a) a lens assembly which transmits light;

(b) a focusing system for moving the lens assembly to focus the optical system; and

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- (c) an aperture assembly which receives light from the lens assembly, said assembly having two settings which differ in the amount of restriction they provide for light transmitted through the optical system;

wherein when the focusing system moves the lens assembly, it also moves the aperture assembly so that the size of the exit pupil of the optical system remains substantially constant during focusing.

42. The optical system of Claim 41 wherein in one of the settings the aperture assembly has an orientation that restricts the amount of light transmitted through the optical system (the light-restricting orientation) and in the other setting the aperture assembly has an orientation that does not restrict the amount of light transmitted through the optical system (the non-light restricting orientation).

43. A binocular comprising two optical systems according to Claim 41, wherein the focusing systems of the two optical systems share at least one common element so as to ensure simultaneous focusing of the two optical systems.

44. The optical system of Claim 1, 3, 11, 20, 35, 37, or 41 wherein:

- (i) the system comprises a moveable lens assembly;
- (ii) movement of the moveable lens assembly changes the magnification of the system; and
- (iii) the moveable lens assembly comprises a doublet.

45. The optical system of Claim 44 wherein:

- (i) the system comprises an eyepiece; and
- (ii) the eyepiece comprises an aspheric surface.

46. The optical system of Claim 11, 20, 35, 37, or 42 wherein:

- (i) for the light-restricting orientation, the optical system has a magnification M_1 and an exit pupil diameter D_1 ;
- (ii) for the non-light restricting orientation, the optical system has a magnification M_2 and an exit pupil diameter D_2 ;

(iii) $M_2/M_1 > 1.0$; and

(iv) $1.0 < D_1/D_2 < 1.5$.

47. The optical system of Claim 1, 3, or 46 wherein:

$$M_2/M_1 \geq 1.5.$$

48. The optical system of Claim 1, 3, or 46 wherein:

$$(D_1 \cdot M_1)/(D_2 \cdot M_2) < 1.0.$$

49. The optical system of Claim 48 wherein:

$$(D_1 \cdot M_1)/(D_2 \cdot M_2) < 0.75.$$

50. A method for switching an optical system between a lower magnification setting and a higher magnification setting comprising:

(a) providing a switching mechanism having a first rest position corresponding to the lower magnification setting and a second rest position corresponding to the higher magnification setting, said switching mechanism having a path of motion between said first and second rest positions; and

(b) providing automatic switching to the first rest position once the switching mechanism has moved past a first position along its path of motion and automatic switching to the second rest position once the switching mechanism has moved past a second position along its path of motion.

51. The method of Claim 50 wherein the automatic switching is provided by a torsion spring.